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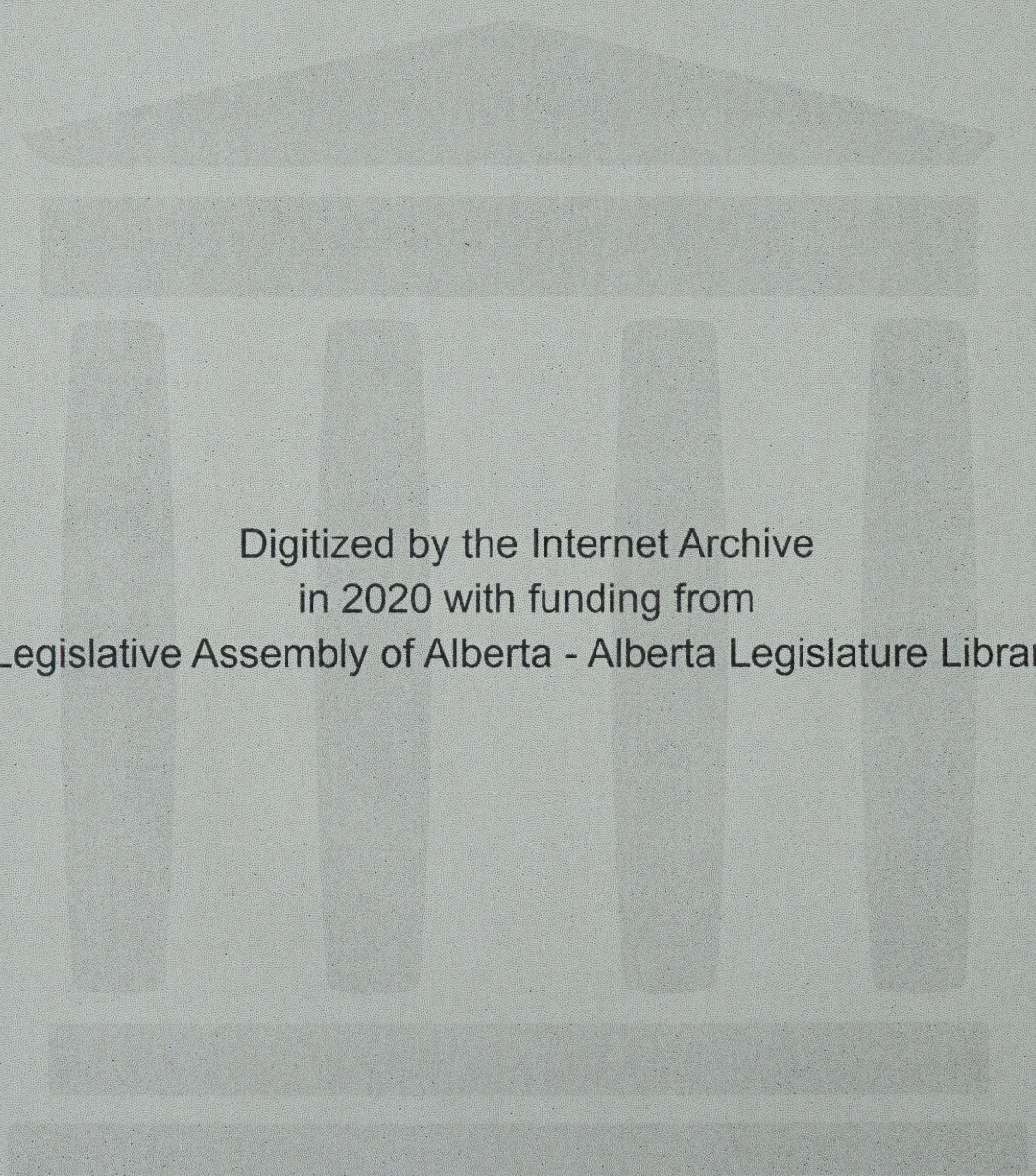
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ALBERTA POWER COMMISSION



1969

ANNUAL REPORT



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GOVERNMENT OF THE PROVINCE OF ALBERTA

ANNUAL REPORT

OF THE

ALBERTA POWER COMMISSION

FOR THE YEAR ENDING

DECEMBER 31, 1969

EDMONTON

J. G. MacGREGOR

CHAIRMAN

February 17, 1970

The Honourable R. S. Ratzlaff
Minister of Industry & Tourism
Legislative Building
EDMONTON, Alberta

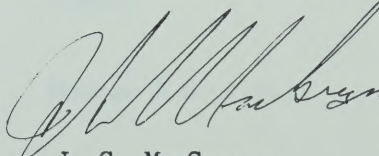
Sir:

I have the honour to submit herewith the Annual Report of the Alberta Power Commission for the calendar year ended December 31, 1969.

An audited statement of receipts and disbursements of the Alberta Power Commission will be sent under separate cover.

Respectfully submitted,

ALBERTA POWER COMMISSION

A handwritten signature in dark ink, appearing to read 'J. G. MacGregor', is written over the typed name.

J. G. MacGregor
Chairman

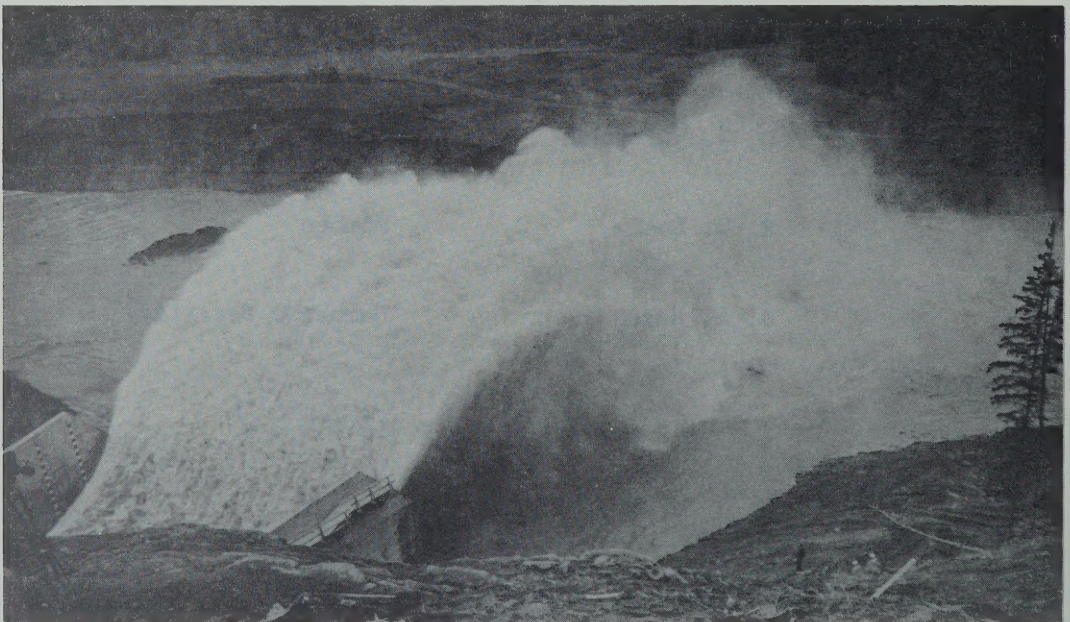
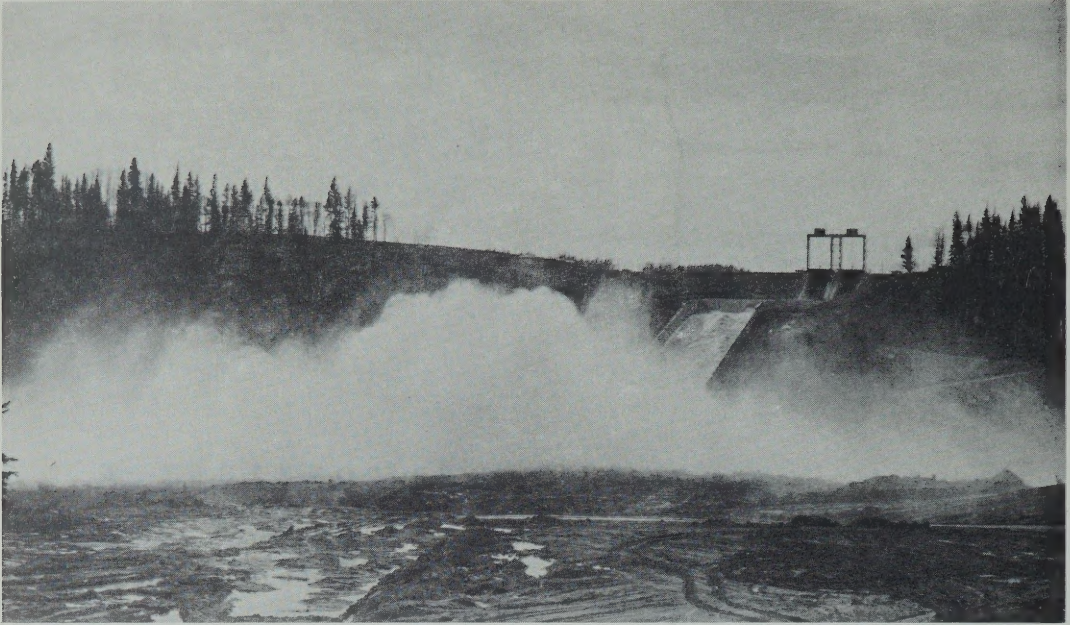
ALBERTA POWER COMMISSION

1969

* * * * *

J. G. MacGregor	Chairman
W. C. Whittaker	Member
R. W. Losie	Member
J. L. Reid	Member & Secretary

* * * * *



THE NEWLY CONSTRUCTED SPILLWAY AT THE BIG BEND HYDRO PLANT ON THE BRAZEAU DAM. WATER ENTERS THE OLD STREAM BED AT RIGHT ANGLES AND THE SPILLWAY IS DESIGNED TO REDUCE EROSION OF THE BANKS.

P R E F A C E

The Alberta Power Commission's duties, as set out under the Power Commission Act, are of a regulatory and supervisory nature. The Commission does not own or operate any power plants, transmission lines or distribution systems. In this respect it is different from the Power Commissions in all the other provinces except Prince Edward Island and Newfoundland. Many of its duties are covered by Section 6 of the Power Commission Act, which is as follows:

"Whenever required so to do by the Lieutenant Governor in Council, the Commission shall inquire into, examine and investigate -

- (a) water powers and water privileges in Alberta,
their value and capacity;
- (b) the existing facilities for the manufacture and
distribution of power in Alberta;
- (c) such other matters relating to power and its distribu-
tion in Alberta as the Lieutenant Governor in Council
from time to time may require; and shall report there-
on to the Lieutenant Governor in Council."

The Commission feels that, at the present time, its principal duties are threefold:

1. The collection of statistics of the Electric Utility Industry in the Province, and the study of these statistics, so that the people of the Province will have a true picture of the industry.
2. The study of hydro-electric sites and other power possibilities

in the Province. The Commission also has been engaged in a study of the existing network of transmission lines in the Province with particular reference to more extensive interconnection which will ensure the most efficient use of the large generating units which are already in operation and of those anticipated in the future.

3. Farm Electrification - This is a phase of its work to which the Commission devotes much of its time. While the main network of farm electrification lines is completed, problems of operating the farm lines, many of which are now over fifteen years old, are taking much more time. The Commission is constantly engaged in studying new operating problems as they come up.

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ALBERTA POWER COMMISSION
ANNUAL REPORT
For Year Ending December 31, 1969

The dynamic growth which has characterized Alberta's economy during the last two decades continued through 1969 and promises to extend into 1970. Three of the four bases upon which the province's progress stands; construction, manufacturing and mineral production, of which an increasing amount has been due to coal, have all presented pleasing prospects. Although the fourth base, agriculture, is experiencing some difficult times due to a severe falling off of its markets, it has suffered less than prairie agriculture as a whole. In spite of these more stringent conditions, comparable statistics compiled by the Alberta Power Commission show that the use of electricity per farm has increased from 7,343 K.W.H. in 1968 to 8,079 K.W.H. during the last year. On the whole, then, Alberta with its diversified economy has had a good year.

This is reflected in the exceptionally large increase of 15.4% in the power generated in the province. To keep ahead of such a high rate of increase in output and to keep abreast of the growing population which is now estimated at 1,561,000, several new generating units are in various stages of completion. Unfortunately, continued and rapid inflation is taking its toll and adding seriously to the cost of providing these large power facilities.

The K.W.H. generated per capita--another good indicator of economic conditions--has increased from 4,631 last year to 5,222. Ten years ago, in 1959, this per capita figure was 2,277, so that on the average every person in Alberta has over twice as much electricity available to serve him as he did then. The province is becoming an

industrialized economy.

Producing and distributing this greatly increased output of electricity has entailed not only the continued expansion of power plants but has also necessitated a marked expansion in the mileage of the network of high voltage transmission and interconnecting lines.

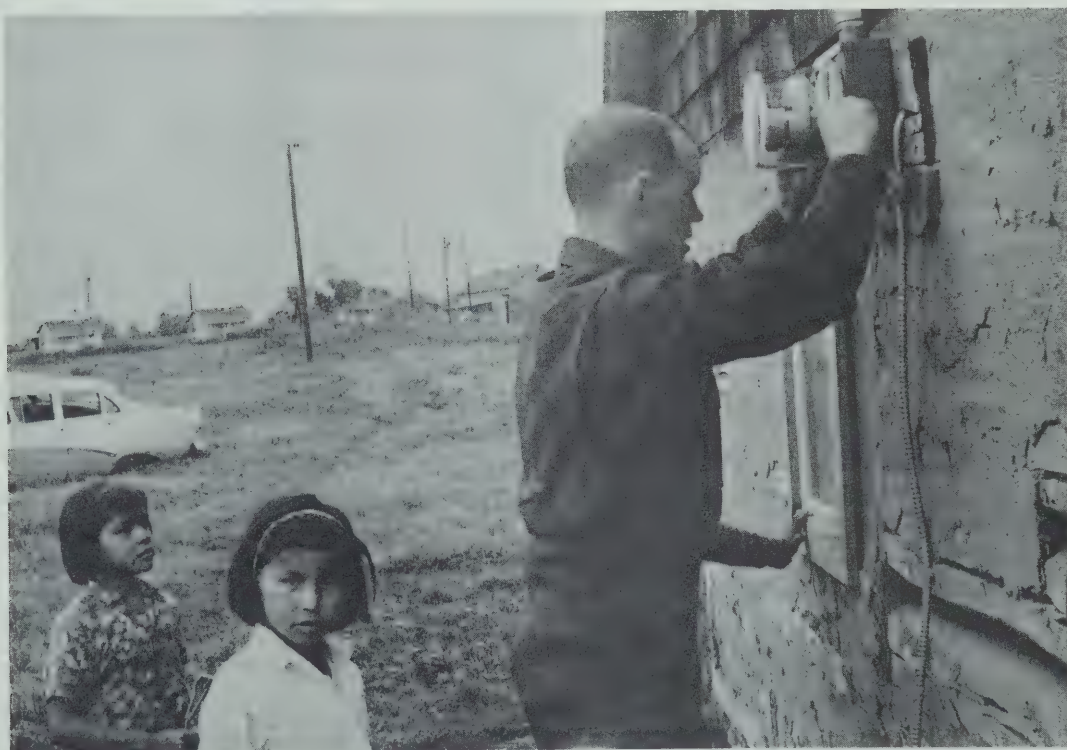
The increase in use of electricity in Alberta during the Year 1969 is indicated by the following short summary. The figures compiled in it and throughout this report are confined to the Electric Utility Industry and are comparable to those presented by the Dominion Bureau of Statistics under the category of "Utilities".

The increase in K.W.H. generated over that of the previous year was 15.4 per cent. Thermal plants generated 83 per cent of the K.W.H. produced, while of the total output, internal combustion plants accounted for 4 per cent. This internal combustion output, of course, is mainly that generated by Northland Utilities Ltd. and Canadian Utilities Ltd. in the Peace River country and includes the power generated by gas turbines at Valleyview, Simonette and Rainbow.

The actual peak load, including 25 M.W. supplied to the B.C. Hydro Authority, showed an increase of 7 per cent. December, 1969 was a very mild month; otherwise the peak would have been considerably higher.

Transmission lines in the province increased by 824 circuit miles to a total of 18,041, which excludes 3,030 miles of company-owned farm lines. Distribution line mileage increased to 7,488. The increase in total circuit mileage of all farm lines built during the year was 417 miles. The total circuit mileage of all power lines in the province at the end of December, 1969 was 73,701.

The figures in Tables 1 to 5 inclusive, and in Tables 8 and 9, which follow, are comparisons with the other Prairie Provinces and with Canada as a whole. Except for those marked with an asterisk (*), the figures used are those obtained from the Dominion Bureau of Statistics.



MOST OF ALBERTA'S INDIAN RESERVES ARE ELECTRIFIED. THIS PHOTOGRAPH WAS TAKEN ON A RESERVE NEAR ST. PAUL.

Table No. 1 shows the capacity in M.W. net of the Utility Electric Stations in Canada for the past several years.

TABLE NO. 1

Capacity of Utility Electric Stations

<u>M.W. Net</u>				
<u>Year</u>	<u>Alberta*</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958	718	14,759	529	741
1959	750	16,937	670	757
1960	917	18,419	737	1,024
1961	947	19,492	754	1,063
1962	1,092	20,383	751	1,065
1963	1,137	21,200	836	1,068
1964	1,178	21,891	922	1,060
1965	1,326	24,157	922	1,387
1966	1,609	25,755	962	1,391
1967	1,895	27,521	1,033	1,407
1968	1,895 (1)	30,599	1,208	1,530
1969	2,043 (1)			

Increase during the 10-year period ended 1968

	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958-1968				
Increase:	1,177	15,840	679	789
Per cent				
Increase:	164%	107%	128%	106%

Increase
Alberta: 1959-1969 = 172%

* Figures for Alberta compiled by Alberta Power Commission. All other figures are D.B.S.

(1) 1968 and 1969 figures for Alberta are "Net Capability", all other figures are "Capacity".

Table No. 2 shows the growth of K.W.H. Generated net during the past several years.

TABLE NO. 2

Electric Energy Generated Net by Utilities

(Millions of K.W.H.)

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958	2,474	75,953	1,810	3,214
1959	2,830	83,049	1,998	3,598
1960	3,126	89,077	2,103	3,690
1961	3,451	89,389	2,422	3,786
1962	3,767	92,096	2,594	4,305
1963	4,141	93,501	2,875	4,785
1964	4,645	102,880	3,202	4,915
1965	5,187	110,798	3,548	5,417
1966	5,739	125,998	3,752	6,102
1967	6,284	133,301	4,151	6,499
1968	7,119	143,833	4,660	6,706
1969	*8,152			

Increase during the 10-year period ended 1968

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958-1968				
Increase:	4,645	67,880	2,850	3,492
Per Cent				
Increase:	188%	89%	157%	109%
Increase				
Alberta: 1959 - 1969 = 188%				

* 1969 figures for Alberta compiled by Alberta Power Commission.
All other figures are D.B.S.

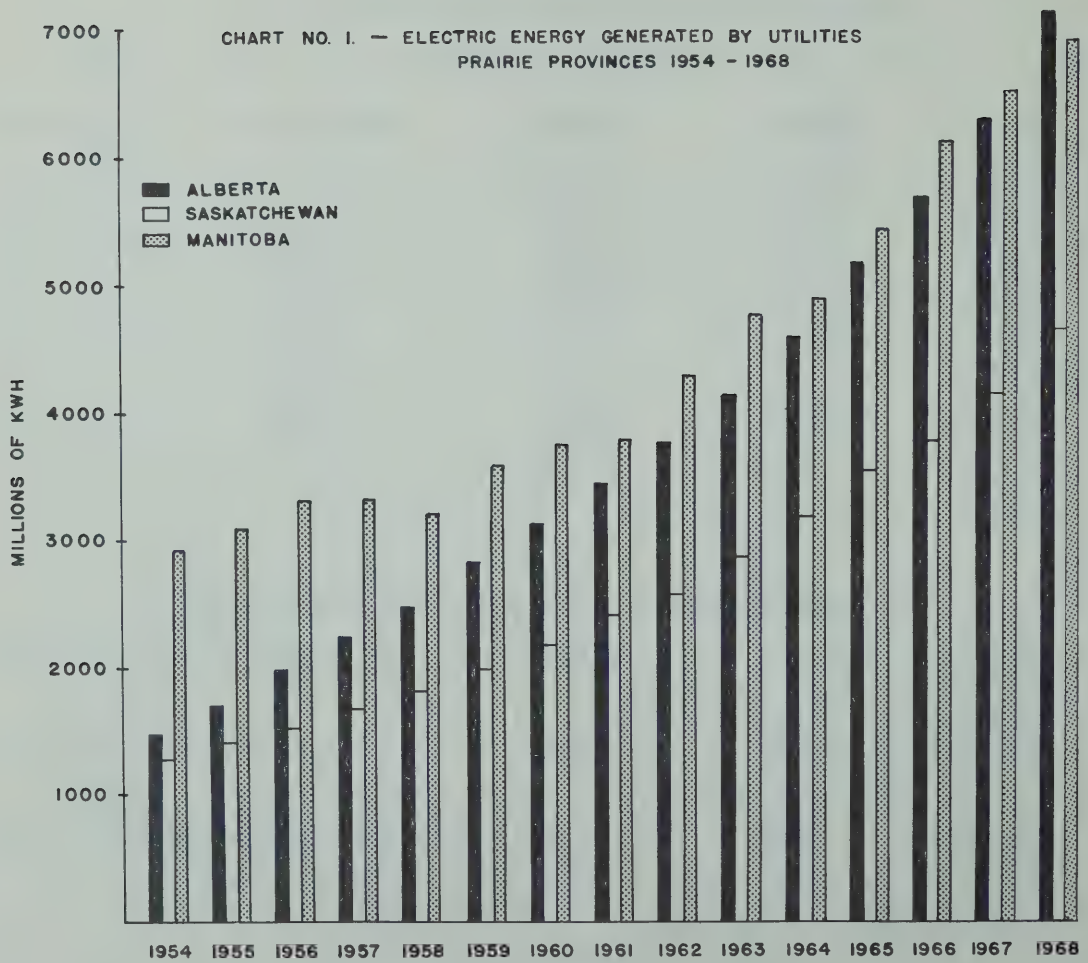


TABLE NO. 3Annual K.W.H. used per Domestic and Farm Customer

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958	2,532	4,128	2,696	6,113
1959	2,859	4,338	2,974	5,993
1960	2,989	4,490	3,019	6,184
1961	3,224	4,660	3,112	6,535
1962	3,417	4,870	3,440	6,468
1963	3,595	5,084	3,688	6,630
1964	3,813	5,307	3,918	7,237
1965	4,193	5,630	4,397	7,582
1966	4,430	5,911	4,673	7,637
1967	4,591	6,261	4,943	7,837
1968	4,859	6,571	5,115	8,062

These are all D.B.S. figures.

TABLE NO. 4Costs in Cents per K.W.H. Domestic and Farm Customers

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958	2.40	1.61	3.08	1.06
1959	2.28	1.61	3.01	1.15
1960	2.22	1.60	2.98	1.16
1961	2.17	1.58	2.93	1.15
1962	2.15	1.54	2.83	1.14
1963	2.05	1.52	2.76	1.16
1964	1.99	1.47	2.59	1.17
1965	1.92	1.43	2.35	1.15
1966	1.87	1.41	2.27	1.18
1967	1.84	1.45	2.22	1.17
1968	1.79	1.48	2.18	1.26

These are all D.B.S. figures.

TABLE NO. 5Total Number of Customers of Utilities(thousands)

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958	316	4,798	230	267
1959	339	5,009	241	282
1960	355	5,178	256	287
1961	368	5,366	265	300
1962	384	5,531	271	304
1963	396	5,647	276	297
1964	408	5,844	286	313
1965	420	5,981	292	303
1966	428	6,147	300	310
1967	439	6,321	307	313
1968	459	6,506	317	317
1969	* 476			

Increase during the 10-year period ending 1968

	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958-1968				
Increase:	143	1,708	87	50
Per cent				
Increase:	45%	36%	38%	19%

Increase Alberta: 1959 to 1969 = 40%.

* 1969 figures for Alberta compiled by Alberta Power Commission.
All other figures are D.B.S.

TABLE NO. 6TOTAL CIRCUIT LINE MILEAGE IN ALBERTA

(Includes transmission, distribution and farm lines)

<u>Year</u>	<u>Trans- mission</u>	<u>Distri- bution</u>	<u>R.E.A. Lines</u>	<u>Company-owned Farm Line</u>	<u>Total Lines</u>
1959	9,693	4,679	35,047	2,949	52,368
1960	10,096	5,034	36,661	3,030	54,821
1961	10,677	5,309	38,058	3,069	57,113
1962	11,491	5,807	39,393	3,086	59,777
1963	12,193	5,819	40,570	3,118	61,700
1964	13,152	6,079	41,652	3,100	63,983
1965	13,839	6,346	42,710	3,137	66,032
1966	14,549	6,628	43,706	3,140	68,023
1967	15,807	6,852	44,279	3,263	70,201
1968	17,217	7,177	44,705	3,050	72,149
1969	18,041	7,488	45,142	3,030	73,701
1959 - 1969					
Increase:	8,348	2,809	10,095	81	21,333
Per cent					
Increase:	86%	60%	29%	3%	41%

All figures compiled by the Alberta Power Commission.

TABLE NO. 7K.W.H. GENERATED PER CAPITA IN ALBERTA

<u>Year</u>	<u>Population</u>	<u>KWH Generated x 10⁶</u>	<u>KWH Generated/ Capita</u>
1959	1,243,000	2,830	2,277
1960	1,283,000	3,126	2,436
1961	1,332,000	3,446	2,587
1962	1,370,000	3,768	2,750
1963	1,405,000	4,186	2,979
1964	1,432,000	4,596	3,209
1965	1,451,000	5,138	3,541
1966	1,463,000	5,689	3,889
1967	1,490,000	6,235	4,185
1968	1,526,000	7,066	4,631
1969	1,561,000	8,152	5,222

TABLE NO. 8Number of Farms Served by UtilitiesAs At December 31 Each Year

<u>Year</u>	<u>Alberta</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958	40,847	50,813	38,700
1959	46,258	55,424	39,027
1960	49,757	59,384	39,162
1961	52,316	62,260	39,326
1962	54,689	59,684	39,489
1963	57,034	61,084	39,639
1964	58,604	62,436	39,589
1965	60,064	62,260	39,452
1966	59,431	65,531	39,594
1967	60,863	67,147	39,579
1968	61,039	67,874	39,359
1969	* 63,174		

* 1969 figure for Alberta compiled by Alberta Power Commission and is not comparable because it includes farms on Indian Reserves. All other figures are D.B.S.

TABLE NO. 9Consumption in K.W.H. per Farm Per Year

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1958	3,566	3,686	2,670	4,586
1959	3,956	4,086	3,180	5,366
1960	4,029	4,345	3,315	5,523
1961	4,404	4,654	3,537	5,995
1962	4,804	5,204	4,198	6,637
1963	4,905	5,985	4,581	7,234
1964	5,370	6,361	5,059	7,921
1965	6,051	7,045	6,065	9,098
1966	6,594	7,720	6,268	9,578
1967	7,128	8,548	6,813	10,504
1968	7,557	9,155	7,095	11,246
1969	* 8,079			

* 1969 figure for Alberta compiled by Alberta Power Commission. All other figures are D.B.S.

PRESENT STATUS OF THE INDUSTRY

The statistics for the Electric Utilities for the year 1969 follow. Some of the minor figures are estimates only, due to the fact that the report has to be prepared before the various utilities have completed their statistics for the past year. These minor estimates will not be in error by more than 1% or 2%, so that the error on the whole will be negligible.

Tables 10 to 16 deal with plant capability, peak load and K.W.H. generated. They break up the figures to show what was generated by hydro, steam and internal combustion engines, and also to show the proportions generated by the publicly-owned and privately-owned plants. Even though the Peace River country is now tied into the provincial grid by two 138 K.V. transmission lines, it is desirable to keep a separate set of figures for its generation, consumption, etc. As a result, these figures are collected in Tables 16 to 20 as a Peace River subtotal.

In 1969, the interconnected system shown in Group A in the tables had a combined capability of 2,024,000 K.W., and generated 8,113,906,000 K.W.H. It served 472,961 customers. This system accounts for over 99 per cent of the generating capacity of the province, and of the K.W.H. generated and number of customers served.

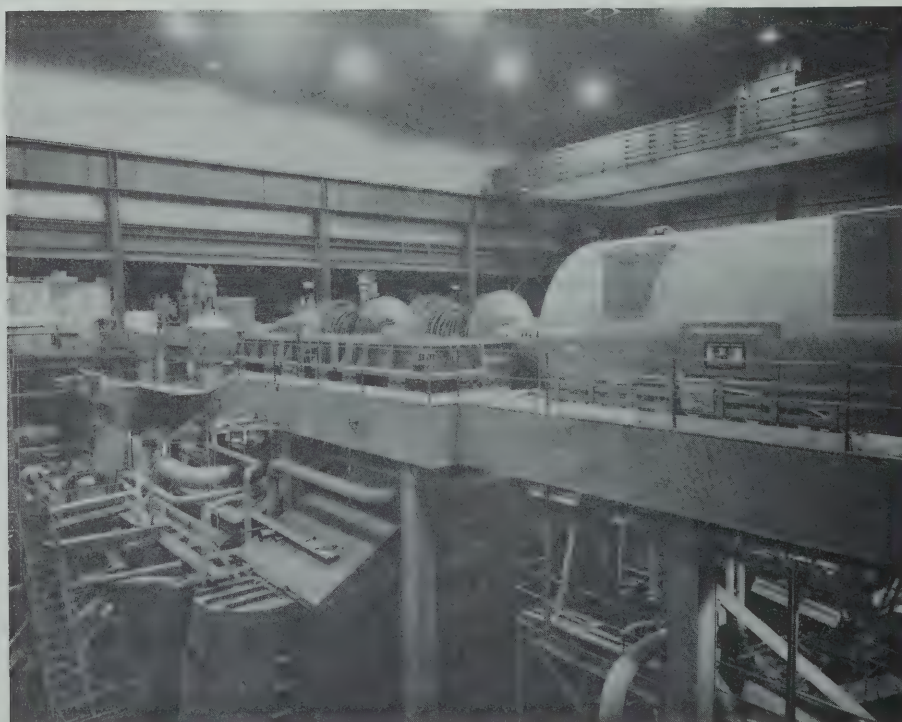
The Peace River Country interconnected system shown as a subtotal under Group A had a combined capability of 71,300 K.W., generated 303,159,000 K.W.H. and served 24,149 customers.

The hydro plants of Calgary Power Ltd. are rated as follows:-

TABLE NO. 10

1969 rating of Calgary Power Ltd. hydro plants:

<u>Plant</u>	<u>Gross H.P.</u>	<u>Net Capability K.W.</u>
Pocaterra	18,500	14,900
Interlakes	6,900	5,000
Rundle	63,000	49,900
Spray	124,000	102,800
Three Sisters	3,600	3,000
Cascade	46,000	35,900
Horseshoe	20,000	13,900
Kananaskis	24,000	18,900
Barrier	16,000	12,900
Ghost	67,450	50,900
Bearspaw	22,000	16,900
Brazeau	450,000	355,000
	<hr/>	<hr/>
	861,450	680,000
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THE TUNED STEEL BASE FOR THE FIRST TURBO-GENERATOR UNDER
CONSTRUCTION IN CALGARY POWER LTD. NEW SUNDANCE PLANT AT
LAKE WABAMUN.

TABLE NO. 11

1969 rating of major thermal plants.

<u>Plant</u>	<u>Fuel</u>	<u>Net Capability K.W.</u>
<u>Calgary Power Ltd.</u>		
Wabamun	Gas	68,000
Wabamun	Coal	501,000
<u>Canadian Utilities Ltd. and Northland Utilities Ltd.</u>		
Battle River	Coal	216,000
Drumheller	Coal	15,500
Vermilion	Gas	9,000
* Sturgeon	Gas	18,500
* Simonette	Gas	19,000
* Rainbow	Gas	28,000
Fort McMurray	Oil and Gas	10,050
Fairview	Gas	5,800
* <u>City of Edmonton</u>	Gas	392,000
* <u>City of Lethbridge</u>	Gas	30,700
<u>City of Medicine Hat</u>	Gas	40,500

* Includes Gas Turbines

Chart No. 2 on Page 14 shows the power generated in the province year by year broken down by the sources of energy used. In so doing, it points up the rapid increase in importance of thermal generation and particularly of coal-fired steam plants.

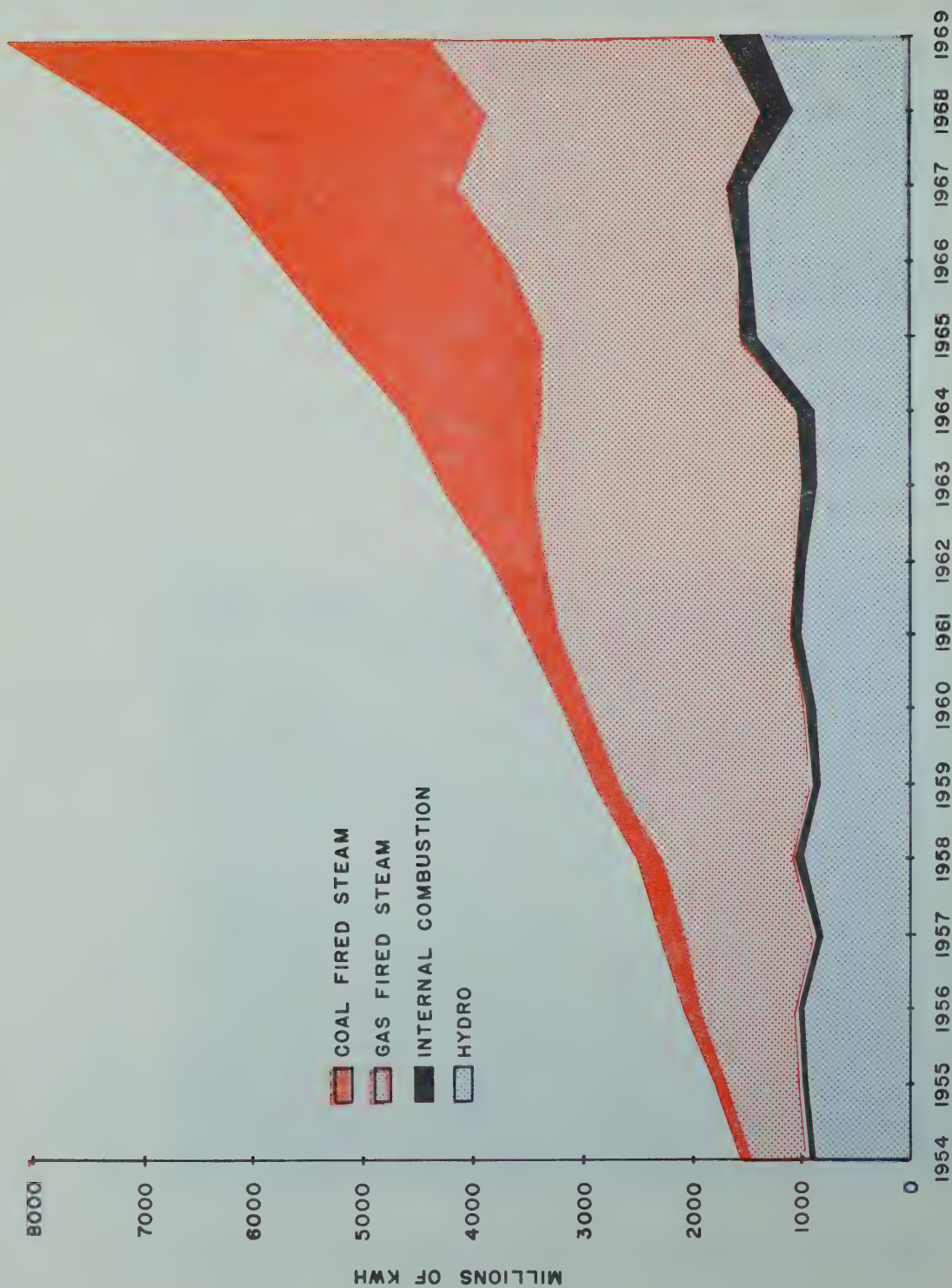


CHART NO. 2 - ELECTRIC ENERGY GENERATED IN ALBERTA 1954 - 1969 BY SOURCES OF ENERGY

TABLE NO. 12

The following Companies or Municipalities provide Central Station Electrical Service in the province. This table gives preliminary data as to their plant capabilities at the end of 1969. It also gives the peak loads on their plants and the M.W.H. they generated (net) during 1969.

<u>PRIVATELY OWNED</u>			
<u>Name of Company</u>	<u>Net Capability K.W.</u>	<u>Net Peak Load K.W.</u>	<u>Net Generation M.W.H.</u>
Calgary Power Ltd.	1,249,000	1,028,900	5,187,152 (1)
Canadian Utilities Ltd. & Northland Utilities Ltd.	<u>331,095</u>	259,170	<u>902,216</u>
	1,580,095		6,089,368
<u>PUBLICLY OWNED</u>			
<u>Name of Municipality</u>			
City of Edmonton	392,000	363,000	1,668,613
City of Lethbridge	30,700	31,500	154,873
City of Medicine Hat	<u>40,500</u>	40,000	<u>238,797</u> (2)
	463,200		2,062,283
Total	<u>2,043,295</u>		<u>8,151,651</u>

(1) Includes 48,975,200 K.W.H. supplied to B.C. Hydro

(2) Includes 85,362,680 K.W.H. supplied to system.

TABLE NO. 13

The following is a rearrangement of the figures in Table 12, so as to break them down into power generated by hydro, steam and internal combustion plants during 1969. Some of the thermal plants include gas turbines.

<u>Name of Company</u>	<u>Net Capability K.W.</u>	<u>Net Peak Load K.W.</u>	<u>Net Gener- ation M.W.H.</u>
<u>HYDRO</u>			
Calgary Power Ltd.	680,000	620,500	1,370,885 (1)
Northland Utilities Ltd.	<u>1,400</u>	530	<u>5,290</u>
<u>Total Hydro:</u>	681,400		1,376,175
	<u> </u>		<u> </u>
<u>STEAM</u>			
Calgary Power Ltd.	569,000	589,900	3,816,267 (1)
Canadian Utilities Ltd.	240,500	199,000	561,312
City of Edmonton	392,000*	363,000	1,668,613
City of Lethbridge	30,700*	31,500	154,873
City of Medicine Hat	<u>40,500</u>	40,000	<u>238,797</u> (2)
<u>Total Steam:</u>	1,272,700		6,439,862
	<u> </u>		<u> </u>
<u>INTERNAL COMBUSTION</u>			
Canadian Utilities Ltd. & Northland Utilities Ltd.	<u>89,195*</u>	59,640	<u>235,614</u>
<u>Total Internal Combustion:</u>	89,195		335,614
	<u> </u>		<u> </u>
 GRAND TOTAL:	 2,043,295		 8,151,651
	<u> </u>		<u> </u>

* Includes gas turbines.

(1) Includes 48,975,200 K.W.H. supplied to B.C. Hydro.

(2) Includes 85,362,680 K.W.H. supplied to system.

TABLE NO. 14

The following table may be of interest as showing the relative percentages of capacity and generation in 1969, as set out in the foregoing tables.

<u>Method of Generation</u>	<u>% of Capability</u>	<u>% of Power Generated</u>
Hydro	33.3	16.9
Steam & Gas Turbine	62.3	79.0
Internal Combustion	<u>4.4</u>	<u>4.1</u>
	100.0	100.0

Publicly owned	22.7	25.3
Privately owned	<u>77.3</u>	<u>74.7</u>
	100.0	100.0

TABLE NO. 15

The following is a breakdown of the fuel used in larger thermal plants during 1969.

	<u>Gas M.C.F.</u>	<u>Oil Gallons</u>	<u>Coal Tons</u>
<u>Calgary Power Ltd.</u>			
Wabamun	6,686,306	-	2,115,067
<u>Canadian Utilities Ltd. & Northland Utilities Ltd.</u>			
Drumheller	-	-	61,678
Battle River	-	-	422,010
Valleyview	1,598,671	-	-
Simonette	1,435,575	-	-
Rainbow	-	11,990,136	-
Fairview	204,851	-	-
Miscellaneous	299,622	782,529	-
<u>City of Edmonton</u>	19,828,864	2,886,590	-
<u>City of Lethbridge</u>	3,061,483	-	-
<u>City of Medicine Hat</u>	4,119,779	-	-
	<u>37,235,151</u>	<u>15,659,255</u>	<u>2,598,755</u>

TABLE NO. 16

SUMMARY OF GENERATING PLANTS IN ALBERTA

As at December 31, 1969

	Hydro		Steam		Internal Combustion	
	Net Capability K.W.	Net Generation 1969 M.W.H.	Net Capability K.W.	Net Generation 1969 M.W.H.	Net Capability K.W.	Net Generation 1969 M.W.H.
A. <u>WITHIN THE INTERCONNECTED SYSTEM</u>						
	680,000	1,370,885	569,000	3,816,267	-	-
			240,500	561,312		
			392,000	1,668,613		
			30,700	154,873		
			40,500	238,797		
Sub-total	680,000	1,370,885	1,272,700	6,439,862	-	-
(2) <u>Peace River Area</u> Canadian Utilities Ltd. and Northland Utilities Ltd. *						
			71,300		71,300	303,159
					71,300	303,159
	680,000	1,370,885	1,272,700	6,439,862	71,300	303,159
Peace River Sub-total						
TOTAL GROUP A INTERCONNECTED SYSTEM						
B. <u>ISOLATED SYSTEMS</u>						
Canadian Utilities Ltd.						
McMurray					10,050	17,714
Miscellaneous Small Plants					1,980	3,251
Northland Utilities Ltd.						
Jasper	1,400	5,290			4,425	9,095
Miscellaneous Small Plants					1,440	2,395
TOTAL GROUP B ISOLATED SYSTEMS	1,400	5,290			17,895	32,455
COMBINED TOTALS	681,400	1,376,175	1,272,700	6,439,862	89,195	335,614
GRAND TOTALS FOR PROVINCE			2,043,295	8,151,651		

* Includes gas turbines.

TABLE NO. 17

Total Circuit Miles of transmission lines in the Province by regional groups as at December 31, 1969.
This does not include company-owned or co-operative-owned farm lines.

	VOLTAGE			Total
	Up to 22,000	33,000 to 72,000	132,000 & greater	
A. WITHIN THE INTERCONNECTED SYSTEM				
(1) Southern Area				
Calgary Power Ltd.	8,064	1,597	2,514	12,175
Canadian Utilities Ltd.	1,536	959	360	2,855
City of Medicine Hat	<u>42</u>	<u>-</u>	<u>-</u>	<u>42</u>
Sub-total:	9,642	2,556	2,874	15,072
(2) Peace River Area				
Canadian Utilities Ltd.	481	431	322	1,234
Northland Utilities Ltd.	<u>853</u>	<u>240</u>	<u>549</u>	<u>1,642</u>
Peace River Sub-Total:	1,334	671	871	2,876
Total Group A - Interconnected System	10,976	3,227	3,745	17,948
B. ISOLATED SYSTEMS				
Canadian Utilities Ltd.	42	-	-	42
McMurray	<u>51</u>	<u>-</u>	<u>-</u>	<u>51</u>
Northland Utilities Ltd.	93			93
Total Group B - Isolated Systems	<u>11,069</u>	<u>3,227</u>	<u>3,745</u>	<u>18,041</u>
COMBINED TOTALS:				

TABLE NO. 18

SUMMARY OF DISTRIBUTION SYSTEMS IN ALBERTAAs at December 31, 1969

	Total Number of Customers Served (includes farms)	MWH Sold, less Sales to other Companies (includes farms)	Circuit Miles of Line (excludes farms)
<u>A. WITHIN THE INTERCONNECTED SYSTEM</u>			
<u>(1) Southern Area</u>			
Calgary Power Ltd.	133,250 (est.)	2,691,856	2,367
Canadian Utilities Ltd.	39,721	394,188	897
City of Edmonton	124,140	1,552,737	1,162
City of Calgary	116,383	1,623,548	1,046
City of Lethbridge	12,566	142,767	155
City of Medicine Hat	9,852	153,434	135
City of Red Deer	7,968	94,706	163
Town of Ponoka	1,674	12,804	28
Town of Cardston	1,004	6,073	35
Town of Ft. Macleod	1,001	6,122	30 (est.)
Town of Blairmore	530	2,610	6
Town of Coleman	536	2,301	5
Village of Cowley	65 (est.)	424	2
Village of Frank	64	334	2
Village of Lundbreck	58	280 (est.)	2
Southern Area Sub-total	448,812	6,684,184	6,035
<u>(2) Peace River Area</u>			
Canadian Utilities Ltd.	12,480	234,970	787
Northland Utilities Ltd.	11,669	214,669	589
Peace River Area Sub-total	24,149	449,639	1,376
TOTAL GROUP A INTERCONNECTED SYSTEM	472,961	7,133,823	7,411
<u>B. ISOLATED SYSTEMS</u>			
Canadian Utilities Ltd.			
McMurray	1,662	16,603	33
Misc. Small Plants	197	2,220	6
Northland Utilities Ltd.			
Jasper	960	13,136	33
Misc. Small Plants	215	1,035	5
TOTAL GROUP B ISOLATED SYSTEMS	3,034	32,994	77
COMBINED TOTALS	475,995	7,166,817	7,488

TABLE NO. 19

SUMMARY OF RURAL ELECTRIFICATION SYSTEMS IN ALBERTA AS AT DECEMBER 31, 1969

	<u>Farm Services With Power In Use</u>	<u>Non-Farms Served By Farm Lines</u>	<u>Total Services In Use On Farm Lines</u>	<u>Circuit Miles of Farm Line</u>
<u>INTERCONNECTED SYSTEM - SOUTHERN AREA</u>				
<u>Calgary Power Ltd.</u>				
Experimental Areas and Individual Rurals	3,848	844	4,692	2,401 *
R.E.A.'s	40,513	8,334	48,847	28,860
<u>Canadian Utilities Ltd.</u>				
Experimental Areas and Individual Rurals	683	133	816	395 *
R.E.A.'s	11,756	1,148	12,904	10,979
<u>Lundbreck Light & Power Co-op</u>	31	54	85	33
<u>Adjacent to Cities, etc.</u>	121	-	121	56 *
<u>Southern Area Sub-total</u>	56,952	10,513	67,465	42,724
<u>INTERCONNECTED SYSTEM - PEACE RIVER AREA</u>				
<u>Canadian Utilities Ltd.</u>				
Experimental Areas and Individual Rurals	125	125	250	75 *
R.E.A.'s	2,950	213	3,163	2,627
<u>Northland Utilities Ltd.</u>				
Experimental Areas and Individual Rurals	155	-	155	103 *
R.E.A.'s	2,992	282	3,274	2,642
<u>Peace River Area Sub-total</u>	6,222	620	6,842	5,448
<u>TOTAL</u>	63,174	11,133	74,307	48,172

* The lines to serve these farms are the property of the Power Companies.

TABLE NO. 20

DATA BY REGIONAL GROUPS
As at December 31, 1969

	<u>GROUP A</u>		<u>GROUP B</u>	<u>COMBINED</u>
	<u>INTERCONNECTED SYSTEM</u>		<u>ISOLATED SYSTEM</u>	<u>TOTALS</u>
	<u>South Area</u>	<u>Peace River Area</u>	<u>Sub-total</u>	
<u>PLANTS</u>				
K.W. Capability	1,952,700	71,300	2,024,000	2,043,295
K.W.H. Generated	7,810,747	303,159	8,113,906	8,151,651
<u>TRANSMISSION</u>				
Miles of Line	15,072	2,876	17,948	18,041
<u>DISTRIBUTION</u>				
Number of Customers	448,812	24,149	472,961	475,995
M.W.H. Sold	6,684,184	449,639	7,133,823	7,166,817
Miles of Line	6,035	1,376	7,411	7,488
<u>RURAL</u>				
Number of farms (1)	56,952	6,222	63,174	63,174
Number of non-farms (1)	10,513	620	11,133	11,133
Miles of Company owned farm line (2)	2,852	178	3,030	3,030
Miles of R.E.A. Line (2)	39,872	5,270	45,142	45,142
Total farm lines	42,724	5,448	48,172	48,172

(1) Included in Number of customers shown under Distribution.

(2) Not included in Miles of Line shown under Distribution or Transmission Lines.

GENERAL OUTLOOK

During 1969 Canadian Utilities Ltd. commissioned its 150 MW coal-fired generating unit in the Battle River plant. At the same time that Company started on its H.R. Milner station at Grande Cache which will lead up to the commissioning of a 145 MW unit in 1972. In the north of the province that Company has been preparing for the installation of a 30 M.W. gas turbine which is expected to go into service at its Rainbow plant during 1970. The other power corporations continued their preparations towards bringing more units into service according to schedules laid out some years ago. The City of Edmonton made good progress at its new Clover Bar station of which the first unit of 159 M.W. will be brought on the line during 1970. Calgary Power Ltd. continued work on its Sundance station where it is planned to have the first 286 M.W. unit in service by the end of 1970. That Company has also started work on its Bighorn hydro plant on the Saskatchewan River leading up to the installation of a 108 M.W. unit during 1972.

A number of changes were made in isolated plants which are not large in terms of capacity but are very significant to the area concerned. A 3,000 K.W. unit was added to the Fort McMurray plant as well as the installation of a plant in the Nipisi oilfield and one at Fort McKay. The completion of transmission facilities made it possible to remove the temporary plants at Zama and Grande Cache.

The transmission line to Zama has extended the provincial grid to a point some 690 miles north of the U.S. border. At the

end of the year the three companies were operating some additional 824 miles of transmission line of all classes.

Year by year such transmission and interconnecting lines are constructed, but, while they are equally as important as power plants, they do not catch the public's attention. During the past ten years many miles of such grid facilities have been built.

The continued activity in the Rainbow Lake area and other oilfields as well as the possibility of further activity in the Athabasca Tar Sands is giving added importance to the electrical utility in the northern part of the province.

Because of Alberta's rich endowment of energy resources with low costs per B.T.U., it becomes most difficult to predict which of them will be used for further power generation. Our program of installing future generating equipment, however, envisages coal-fired and gas-fired steam units with an occasional hydro plant such as the Bighorn which will be rated at 108 M.W.

While installations of nuclear power have been making great strides in the East and in the U.S., they are still a long way from being competitive with Alberta's fossil fuels. Ultimately, perhaps before twenty years have elapsed, nuclear power will set the upper limit of what can be paid per million B.T.U.'s for coal for power generation.

To supply Alberta's load during the 30-year period from 1971 to 2000, we expect to add thermal plants totalling some 10,000 M.W. In addition to this, of course, there will be many M.W. installed in the existing or new hydro plants but, while it is possible that some hydro plants may be built for base load operation,

this added capacity will be used mainly for peaking purposes. Naturally, the picture even twenty years from now is pretty hazy.

Normally, we would expect to build a power plant on one of the seams of coal and then to install generators up to the limit of the capacity of that coal mine before moving on to another site on another mine. Other factors such as geography, etc. come into this picture and it is quite possible that a second power plant on a second mine would be started before all of the generating capacity is put into a previous plant. Normally, one would expect to develop the mine with the least costly coal first and then to move on to the next lowest cost coal. This, too, will not always be the case because of geographical considerations.

Somewhere after 1990, when loads are large enough to enable a large nuclear plant to operate at a high load factor, such a plant may then be competitive with the higher cost strip coals which are still not committed for base load generation. But even after having installed the first nuclear plant, it will probably be advisable to build more coal-fired plants before building a second nuclear station.

The following is a more detailed summary of the changes to generating capacity, transmission line facilities, etc., during 1969.

CALGARY POWER LTD.

(1) Plant Capacity

Construction is continuing at the Sundance plant on the south side of Lake Wabamun. This will be a 286,000 KW (net) coal-burning unit and is scheduled for operation in 1970.

Work is underway on the Bighorn Storage and Power Development project, situated on the North Saskatchewan River, 80 miles west of Rocky Mountain House. The diversion tunnel will be completed by mid-summer of 1970. The capacity of the Bighorn Hydro plant will be 108,000 KW.

(2) Transmission Lines

During 1969, the main transmission lines have been increased as follows:

240 KV

A steel tower line was completed from the Bow River to Stavely, a distance of 53 miles.

138 KV

A twelve mile line was built from Fort Saskatchewan to Redwater, serving the new Imperial Oil complex.

69 KV

Thirteen miles of 69 KV line were constructed from Brooks to Duchess. Devon and Nisku were linked with 13.6 miles of 69 KV line.

22 KV

A total of 77 miles of new 22 KV line was built, serving the following areas and plants:

- From Brazeau to the Tenneco Gas Plant, covering 22 miles.
- From Rocky Mountain House to the Amerada Gas Plant, a distance of 13 miles.
- From Nordegg to the Bighorn project, extending 15 miles.
- To Shell Oil's Burnt Timber Gas Plant west of Cremona, covering a distance of 15 miles.
- From Milk River to Western Decalta Petroleum, running 12 miles.

(3) New Substations

Ponoka - 331S	10 MVA 138/23.9 KV substation.
Brooks - 121S	138/69/23 KV substation, replacing the old Brooks - 1S substation.
Whitecourt Gas Plant-1072S	1000 KVA 69/2.4 substation feeding the Whitecourt Gas Plant.
Duchess - 339S	6 MVA 69/23.9 KV substation.
Coleman Collieries Racehorse Creek - 905S	1500 KVA 69/6.9 KV substation serving Coleman Collieries coal preparation plant.
Highvale Mine - 4021S	5 MVA substation at Calgary Power's Sundance Steam Plant's Highvale Mine operation.
Robb - 955S; Cadomin - 983S; Luscar - 984S	Three new 69 KV substations serving the communities of Robb, Cadomin and Luscar, and such industrial firms as the Inland Cement Plant's operations at Cadomin and Cardinal River Coals.
Devon - 14S	Relocated and rebuilt 69/23.9 KV substation to serve Devon and district and Imperial Oil.
Mobile Substation	Calgary Power is currently awaiting arrival of a mobile substation, due for delivery in early 1970. This is a 10 MVA substation rated at 138/69/24.9/14.4/7.2/4.16/2.4 KV.

Extensions to Main Substations

Rocky Mountain House - 262S	Installed a 2.5 MVA transformer.
Nisku - 149S	Added a 15 MVA 138/69 KV transformer.
Wetaskiwin - 40S	Installed a 25 MVA 138/69 KV transformer.

Red Deer - 8S	Installed a 25 MVA 138/24.9 KV transformer, including a new two-bay 138 KV steel structure and 23.9 KV additions.
Fort Macleod - 15S	Added 16 MVAR 135 KV capacitors.
Brazeau - 294S	Installed a 2500 KVA transformer stepping down to 13.8 KV.

(4) Services

New Communities

The hamlets of Moses Lake and Sun Haven Beach were provided with service during 1969.

Street Lights

Approximately 438 Mercury Vapor street lights were added to the Calgary Power system during 1969. Included in this figure is the replacement of some 85 Radial Wave units of the incandescent type.

Oilfields

Additional oilfield service load of 13,005 HP was connected to the system in 1969. This included oilwell pumps, gas well pumps, gathering systems, water pump and injection systems and other miscellaneous services. Due to the utilization and termination of other oilfield services, the net increase amounted to 7,382 HP.

The Pembina field was the most active area during the past year. There is now a total of approximately 85,000 HP connected to oilfield services in Calgary Power's service area.

Industrial and Power Services

Large, new and expanded industrial installations added some 21,000 KW of load to the system in 1969, with an additional 21,000 KW committed for the near future.

CANADIAN UTILITIES LTD.(1) Plant Capacity

The 150,000 KW coal-fired steam generator at the Company's Battle River site was commissioned in mid-December. The addition of this unit nearly doubles the Company's capacity that is connected to the provincial grid.

In 1970 the Company plans to add a 30,000 KW gas turbine generator to the grid at its Rainbow Lake site where it will meet growing load requirements and maintain voltages in the northern portion of Northland Utilities Ltd. system.

During 1969 the following changes in capacity were made to some of the Company's isolated plants:

<u>Plant Name & Location</u>	<u>Capacity Added in 1969</u>	<u>Capacity Removed in 1969</u>	<u>December 31 1969 Capacity</u>
Fort McMurray	3,000 KW	500 KW	10,050 KW
Nipisi Oilfield	1,200 KW	0	1,200 KW
Fort McKay	70 KW		70 KW
Miscrowave Sites		20 KW	90 KW
Grande Cache		800 KW	0 KW

(2) Transmission Lines:

During the year Canadian Utilities Ltd. built the following lines:

Simonette to Grande Cache	144 KV	64 miles
Derwent to Bonnyville	144 KV	51 miles
Kitscoty to Paradise Valley	72 KV	18 miles
Veteran to Consort	72 KV	14 miles

(3) Substations

There was one new major substation constructed at Paradise Valley

with a capacity of 6,000 KVA and operating at 72/25 KV. Existing substation capacities were increased by 40,000 KVA at Bonnyville substation, operating at 144/72 KV; 8,000 KVA at Swan River substation, operating at 72/25 KV; 6,000 KVA each at the Nipisi Oilfield plant substation and the Hudson's Bay Oil and Gas substation near Fox Creek; 3,750 KVA each at the Drumheller 25/4.16 KV substation and the Peace River Oil Pipeline 72/2.4 KV substation near Valleyview; and 3,000 KVA at the Swan Hills substation, operating at 25/2.4 KV.

NORTHLAND UTILITIES LIMITED

(1) Plant Capacities

During 1969 Northland Utilities Limited made the following changes to generating capacity at some of its plants.

<u>Plant Name & Location</u>	<u>Capacity Added In 1969</u>	<u>Capacity Removed In 1969</u>	<u>Capacity December 31, 1969</u>
Fairview	0	3,000 KW	6,000 KW
Jasper	600 KW	0	4,425 KW
Zama Lake	0	1,850 KW	0 KW
Wabasca	0	100 KW	550 KW
Atikameg	100 KW	40 KW	175 KW

(2) Main Transmission Lines

During 1969 the Company completed construction of 53 miles of 144 KV line from Rainbow Lake to Zama Lake to serve growing oilfield loads in that area.

(3) Substations

Two new substations were constructed by Northland Utilities Limited during 1969. One in the Zama Lake area has a capacity of 3,000 KVA and the

other, at Valleyview, has a capacity of 6,000 KVA. Both substations are operated at 72/25 KV. 6,000 KVA was added to the existing 72/25/14.4 Rainbow Lake substation.

CITY OF EDMONTON

During 1969, construction advanced well on the City of Edmonton's new Clover Bar generating station in which it is planned to install a first unit of 159 M.W. capability during 1970.



PART OF THE 69 KV LINE BUILT THROUGH THE MOUNTAINS TO SERVE THE RACEHORSE CREEK MINE 20 MILES NORTH OF COLEMAN IN THE CROWSNEST PASS.

FORECAST TO 1974

Table 21 shows the growth which we believe will take place in the electrical load of the province from now until 1974. It shows the actual capability in M.W. of the power plants as at December 31, 1969, the peak load that occurred and the minimum capability required. In a large power system it is always necessary to have reserve capacity in case one or more units fail. Current practice on this continent is to maintain a reserve of whatever is the greater of:- (1) 12% of the estimated peak load, or (2) the largest unit.

On this basis, we have shown a column which we have called Minimum Capability Required. Since in 1969, for instance, the largest unit in the province was rated at 286 MW, the minimum capability required had to be so large that if this unit went out of service we would still have a capability equal to or greater than 1,564 MW, which of course was the estimated peak load. As will be seen from the table, we had a capability of 2,024 so that if the 286 MW machine had failed, we would still have had 1,738 MW of capability to carry a peak load of 1,564 MW.

Table 21 indicates that by the end of 1974 our power plant capability will increase from 2,024 MW as at the end of 1969 to 3,197 MW-- five years later. All but 108 MW of this increased capability will be thermal.

Making a detailed forecast for the further five years to 1979 is a little venturesome, but by the end of that year, as we see it at the moment, we will have a power plant capability of about 4,700 MW. This increased capability will most likely be obtained by adding the equivalent of at least three more 286 MW thermal units and will involve starting on another large strip mine and possibly a second. We would expect our power generating capability in 1979 to be two and one-half times of what it is now.

TABLE NO. 21

FORECAST OF NET GENERATING CAPABILITY IN M.W. WITHIN THE INTERCONNECTED SYSTEM

	Net Capability added during Year	Net Capability at End of Year	Estimated Peak Load	Minimum Capability Required *
Capability as at December 31, 1969	-	2,024	1,564	1,850
Capability to be added 1970				
Calgary Power - Sundance	286			
Canadian Utilities - Rainbow	30			
City of Edmonton	<u>152</u>			
Total, December 31, 1970	475	2,499	1,760	2,046
Capability to be added 1971	-			
Total, December 31, 1971		2,499	1,930	2,216
Capability to be added 1972				
Canadian Utilities - McIntyre	145			
Calgary Power - Bighorn	<u>108</u>			
Total, December 31, 1972	253	2,752	2,160	2,446
Capability to be added 1973				
City of Edmonton	<u>159</u>			
Total, December 31, 1973	159	2,911	2,400	2,688
Capability to be added 1974				
Calgary Power - Sundance	<u>286</u>			
Total, December 31, 1974	286	3,197	2,650	2,968

* Estimated Peak Load plus the greater of 12% or the largest unit.

FARM ELECTRIFICATION

For some years now farm electrification lines have extended into even the most remote bays of the farming areas. During 1969 the Commission gave approval to over 1,000 applications for new services in R.E.A.'s. While all of these had not been built by the end of the year, nevertheless, including those approved during 1968 but constructed during 1969, 1,308 new farm services were built to bring the total farm services put up since the beginning of the program to 65,039. Of the new services added during the year over 130 have been to serve homes of essentially urban people who have moved out of the cities to live.

Although 1,308 new farm services were connected, the number of R.E.A. farms using power at the end of the year only increased by 230. During the year 80 services which had been built over the years were salvaged, while there was an increase of 998 in services which were disconnected, temporarily or otherwise, but left standing. Of the services disconnected during 1969, 437 were in territories served by either Farm Electric Services or the Lundbreck Light & Power Co-op, while 505 were in Canadian Utilities area and 56 in Northland Utilities' area. A larger percentage of services were disconnected in the northern portion of the province than in the southern area. This indicates that at the present time more consolidation of farms is taking place in the northern part of the province.

According to the 1966 census Albertans operated 69,411 farms but only lived on 61,997 of them. Since that year, the number of farms on which someone lives has continued to decrease and we estimate that there are now less than 61,000 in that category.

TABLE NO. 22

FARM ELECTRIFICATION AS AT DECEMBER 31, 1969 (R.E.A.'s ONLY)

	Farm Services Constructed	Services Salvaged Or Transferred to Other Uses	Services With Power Available	Services Disconnected	Farm Services With Power In Use
<u>SOUTHERN AREA</u>					
Calgary Power Ltd.	44,607	337	44,270	3,757	40,513
Canadian Utilities Ltd.	13,436	89	13,347	1,591	11,756
Lundbreck Light & Power Co-op	38	2	36	5	31
Southern Area Sub-total	58,081	428	57,653	5,353	52,300
<u>PEACE RIVER AREA</u>					
Canadian Utilities Ltd.	3,475	15	3,460	510	2,950
Northland Utilities Ltd.	3,483	11	3,472	480	2,992
Peace River Area Sub-total	6,958	26	6,932	990	5,942
Total R.E.A. Farm Services	65,039	454	64,585	6,343	58,242

There is a discrepancy between this number of farms on which someone lives and the 63,174 farm services which are energized. Any comparison between these figures is complicated by a number of factors: the number of farms from which the farmer has moved off but left the service there, the varying definitions of a farm including Indian homes on reserves, and the movement of city people to small acreages in the country which, because they own a horse or two or some chickens, the R.E.A.'s consider as farms.

For these reasons, it is not possible to give meaningful percentages of saturation of farm electrification, but it is over 90 per cent in the Peace River area and close to 100 per cent in the rest of the Province.

The Dominion Bureau of Statistics classifies farms on the basis of income. Farms with receipts of \$2,500 or more a year are classified as commercial farms, while small scale, part-time, and residential farms receiving less than \$2,500 from the sale of agricultural products are considered non-commercial operations.

Changes in farm numbers in Alberta on the above basis are shown in the following table:

	<u>1961</u>	<u>1966</u>	<u>% of Change</u>
Commercial Farms	45,203	48,971	+ 8.3
Other Farms	23,009	20,440	-27.0
	<hr/>	<hr/>	<hr/>
All Farms	73,212	69,411	- 5.2

A reduction in the number of small farms, accompanied by an increase in commercial farms, is most pronounced in the central

ALBERTA POWER COMMISSION

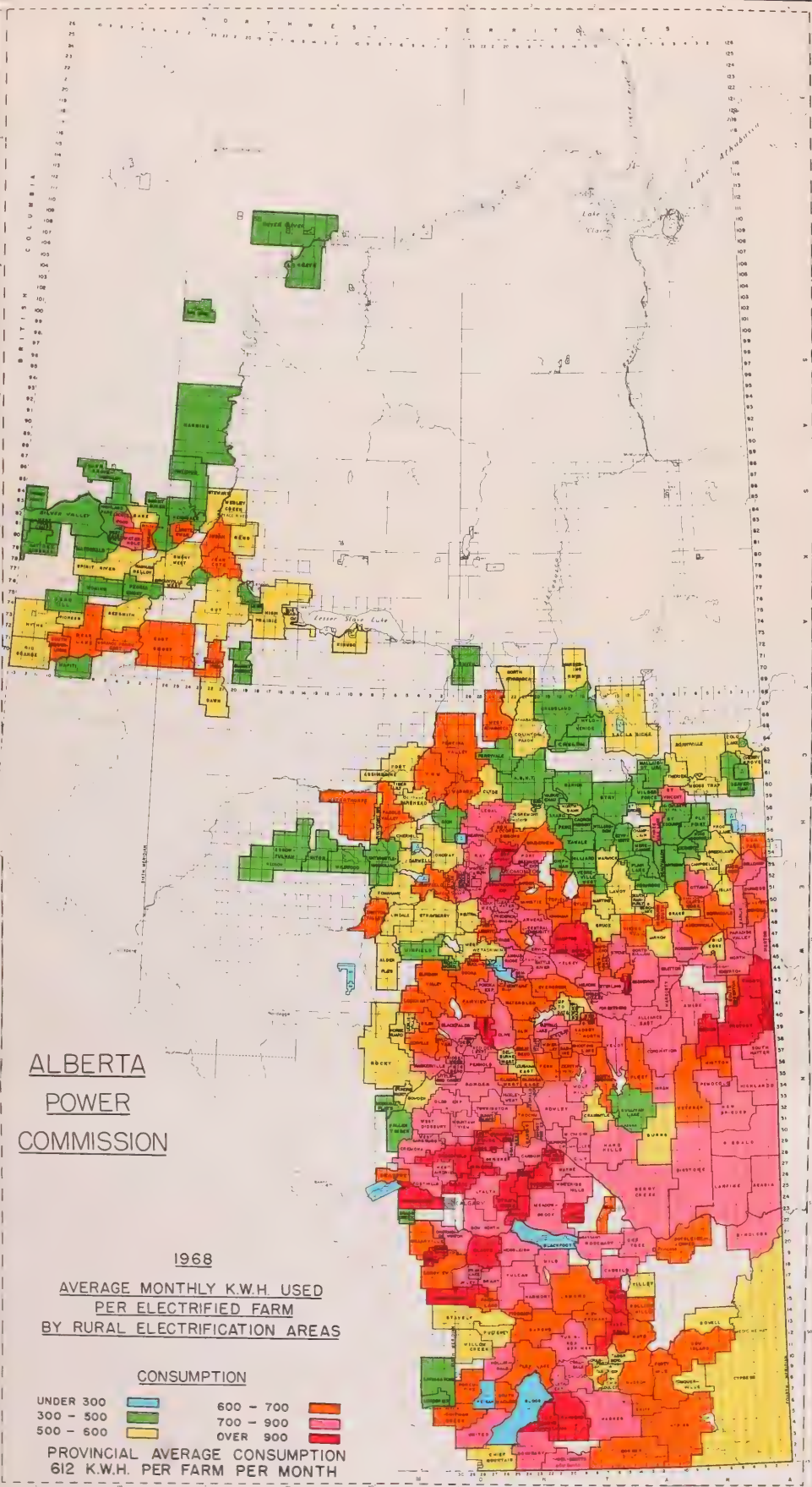
1968

AVERAGE MONTHLY K.W.H. USED
PER ELECTRIFIED FARM
BY RURAL ELECTRIFICATION AREAS

CONSUMPTION

UNDER 300	300 - 500	600 - 700	700 - 900
500 - 600		OVER 900	

PROVINCIAL AVERAGE CONSUMPTION
612 K.W.H. PER FARM PER MONTH



and northern regions of Alberta. A 21 per cent increase in the number of commercial farms in the Peace River area is just about equalled by the 18.5 per cent decrease in small farms.

The trend towards the development of commercial farms, which has been accompanied by a decrease in non-commercial farms in the last five years, can be expected to continue. The period of adjustment will take longer in areas such as the grey-wooded soil zone, including the Peace River area, where homesteading is still being practised.

Even though Alberta's farming industry is in a period of readjustment and has been experiencing some difficult times, it nevertheless accounts for 19 per cent of the net value of production of Alberta's industries of which the four main ones are shown below. It is interesting to compare the relative position of these industries as they were 20 years ago and now as shown by the following table:

<u>Industry</u>	<u>Net Value of Production in per cent</u>	
	<u>1950</u>	<u>1969</u>
Construction	20	24
Farming	44	19
Manufacturing	17	20
Mining	16	34

Although, in relation to other industries, agriculture's share of production has declined, nevertheless, its value has increased from \$330,000,000 in 1950 to \$620,000,000 in 1969--unfortunately in inflated dollars. Moreover, in spite of somewhat difficult times, statistics compiled by the Commission show that electricity used per farm has increased from 7,343 KWH in 1968 to

8,079 KWH during the past year.

The increase in the number of Indian homes or farms on reserves being served by power lines is encouraging. Although the census only shows some 600 Indian farms, over 2,500 Indian homes now have central station service and, as might be expected, the bulk of these are south of the Athabasca river. During 1969 the customers on the Puskiakiwenen reserve changed from R.E.A. consumers to company customers. About 550 Indian homes in some reserves are served as customers of the power company while 1,922 of them are served as R.E.A. customers mainly in the following reserves:-

Alexander	Louis Bull
Alexis	Montana
Beaver Lake	Peigan
Big Horn	O'Chiese
Blood	Samson
Blackfoot	Sunchild
Eden Valley	White Whale
Enoch	Le Goff
Ermineskin	Morley

As will be seen from Table 19, while there are 63,174 farms actually using power, the farm electrification lines also serve 11,133 non-farm customers. Of these, 10,031 are served off R.E.A.-owned lines, while the remaining 1,102 obtain their service from company-owned farm lines. The total number of rural customers associated with these farm electrification lines is therefore 74,307.

As at the end of December, 1969, there were 48,172 miles of farm line of which 45,142 were owned by the R.E.A.'s. During the year, there was an increase of 417 miles in all categories of farm lines.

Financing

At the end of December there were a total of 385 active Rural Electrification Associations. These Associations have borrowed under the Guarantee Act, the Revolving Fund Act and the Long Term Financing Act, and the total of all of these borrowings for new construction has been approximately \$56,887,000. At December 31, 1969, about \$40,998,000 of this had been paid back. The investment in R.E.A. and other rural lines in the province is slightly over \$65,000,000.

Up to the end of 1969, the Power Commission had given approval to 6,481 applications for loans under Part I of the Revolving Fund Act or under the Long Term Financing Act. While all of this money had not been borrowed by the end of December, the approvals covered 47,091 farms at an estimated cost of \$56,504,900.

During 1969, the Power Commission gave approval to applications for loans under Part I of the Revolving Fund Act or under the Long Term Financing Act for an amount of \$1,654,491 to give service to 1,070 farms. Of this amount, \$1,629,252 was approved where no Part II loan was necessary. Of these 1,070 farms, only 10 of them were in areas that needed assistance of Part II loans totalling \$8,126.00. The framework of lines in these new Part II areas will make it possible for additional farmers to connect to them whenever they are ready.

Since its inception, approvals of loans under Part II legislation have totalled \$2,223,923. As at December 31, 1969, \$216,938 of this remains outstanding, including \$8,126.00 loaned during 1969. Out of a total of 373 Part II loans which have been

issued to date, 281 have been repaid in full and a great many more are nearly paid off.

Operating Conditions in R.E.A.'s

Even though the construction phase of farm electrification is practically finished, well over 1,000 farms continue to be hooked up each year. It is still necessary, therefore, for the power companies to maintain farm construction crews but the nature of their work is changing. As well as doing the tasks necessary to operate the farmers' lines and to perform maintenance on them, the crews are now faced with the work involved in moving lines for road widening, providing increased clearance over graded-up roads and revamping some portions of the R.E.A.'s systems to gear them up to carrying the increasingly large loads being placed on them. The emphasis of farm electrification has changed from being mainly construction to the more or less regular business of operating and revamping R.E.A. systems--some of which are now over twenty years old.

The experience we are having with these systems parallels that of the other lines which the power companies have been operating for several decades. Unfortunately, as in all other construction, the cost of building lines keeps going up. The cost of material and labour keeps increasing but these increases are not so serious as that occasioned by having to move crews around to hook up one or two farmers in each R.E.A. The time and cost incurred by this moving around doing a small job here and another there runs up the cost of separate extensions far beyond what it was a few years ago when many

farmers were being hooked up as a group in each R.E.A. The power companies have adjusted their crews and the scheduling of these jobs so that as far as possible a farmer requesting service does not have to wait too long, although, unfortunately in spite of this, some problems still arise.

As usual, the Commission has checked the statements which the companies have rendered to R.E.A.'s, showing the costs of building their lines. In addition to this, some field checks have been made on various farm areas. With very minor exceptions, these costs have always been found to be correct.

In all of the years up to 1968, the actual operating costs have been less than the monthly charge made to the farmer in his power bill, so that at the end of each of those years the companies were able to make a refund to the Deposit Reserves of the Associations. Unfortunately, the utmost efficiency in operating these lines is not enough to keep pace with the inflationary rise in material and labour costs. Moreover, as the lines get older, considerable maintenance is becoming necessary and this adds to operating expenses. Increases in cost and inflation are gradually narrowing the spread between the actual costs and the nominal operating surplus. The following table shows the operating surplus back to 1959.

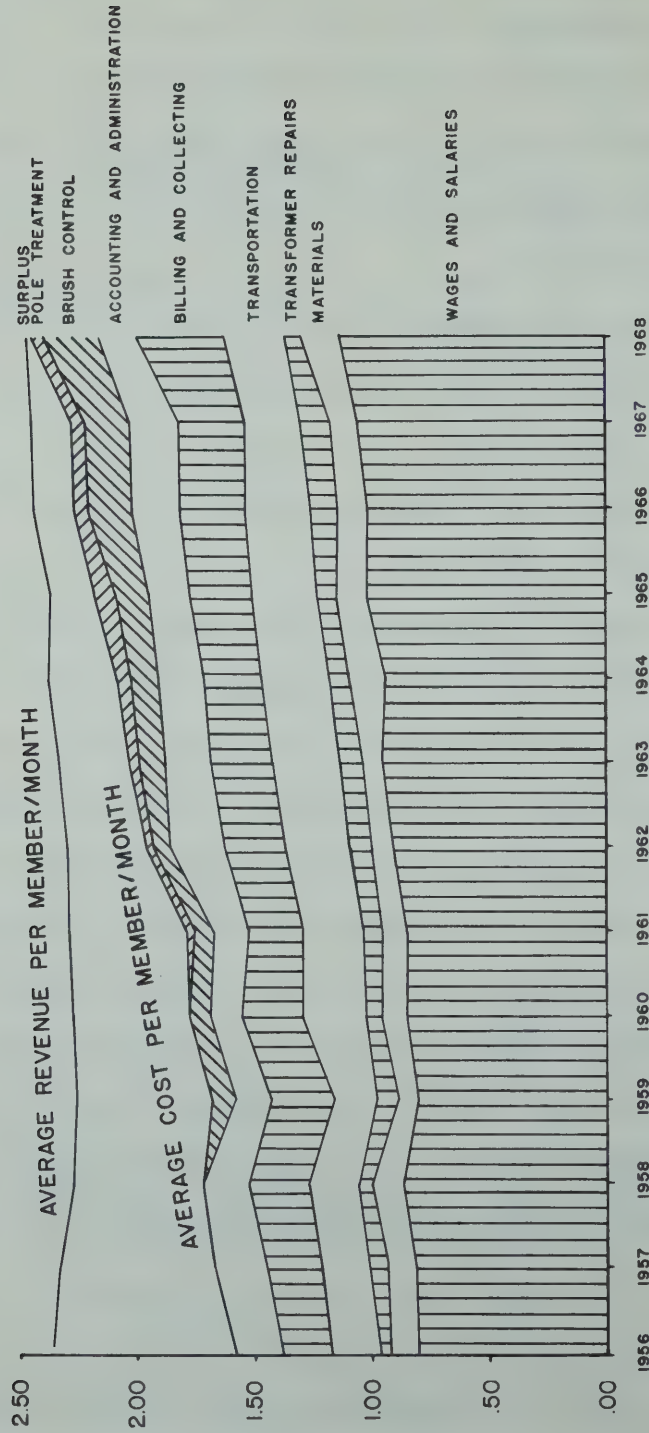


CHART NO. 3 - OPERATING REVENUE AND COMPONENTS OF COST OF OPERATION FOR THE YEARS FROM 1956 - 1968.

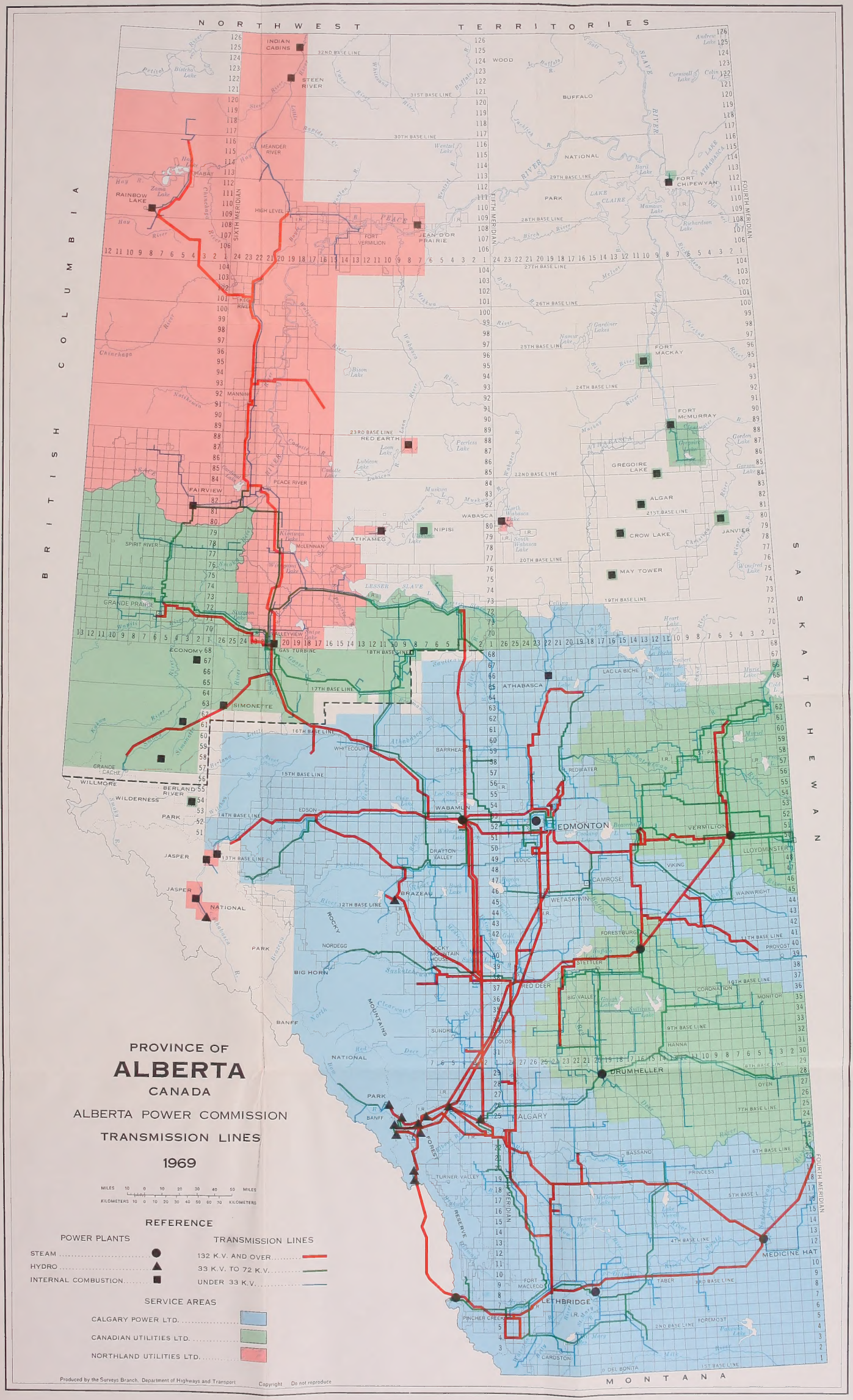
Excess Operating Refund per Member Month

<u>Year</u>	<u>Farm Electric Services Ltd.</u>	<u>Canadian Utilities Ltd.</u>	<u>Northland Utilities Ltd.</u>
1959	.53	.81	.02
1960	.51	.55	.02
1961	.45	.69	.13
1962	.24	.63	.29
1963	.20	.54	.50
1964	.18	.61	.66
1965	.15	.27	.43
1966	.02	.58	.33
1967	.04	.51	.27
1968	(.18 Deficit)	.54	.35

Chart No. 3 shows revenue and the components of cost of operation for the years 1956-68.

The Power Commission has endeavoured to study all phases of farm electrification. The operation of farm lines presents many intricate problems that change as the years go by. In its engineering and accounting aspects, farm electrification is highly technical and the individual R.E.A. does not have the time nor the opportunity to investigate these matters. The Commission feels that one of its main responsibilities is to see that consideration is given to every factor that could possibly reduce the cost of electricity to the farmers, and to improve the efficiency of service.

During 1969, the average use on Alberta farms was 8,079 K.W.H. This is more than double the power used per farm ten years ago. While farm consumption has doubled during the past decade, the K.W.H. generated per capita during the same period has increased more rapidly.



PROVINCE OF
ALBERTA
CANADA
ALBERTA POWER COMMISSION
TRANSMISSION LINES
1969

MILES 10 0 10 20 30 40 50 MILES
KILOMETERS 0 10 20 30 40 50 KILOMETERS

REFERENCE

- | | |
|---------------------------|-------------------------|
| POWER PLANTS | TRANSMISSION LINES |
| STEAM | 132 K.V. AND OVER |
| HYDRO | 33 K.V. TO 72 K.V. |
| INTERNAL COMBUSTION | UNDER 33 K.V. |

SERVICE AREAS

- | | |
|-------------------------------|-------------|
| CALGARY POWER LTD. | [Blue Box] |
| CANADIAN UTILITIES LTD. | [Green Box] |
| NORTHLAND UTILITIES LTD. | [Red Box] |

